

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property  
Organization  
International Bureau



(43) International Publication Date  
24 June 2004 (24.06.2004)

PCT

(10) International Publication Number  
**WO 2004/052334 A3**

(51) International Patent Classification<sup>7</sup>: **A61K 9/00**

(21) International Application Number:  
PCT/GB2003/005353

(22) International Filing Date:  
10 December 2003 (10.12.2003)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
0228826.4 11 December 2002 (11.12.2002) GB

(71) Applicants and

(72) Inventors: **LARHRIB, El, Hassane** [FR/GB]; 38 Eirle Road, Liverpool L7 6HF (GB). **OKPALA, Joseph** [GB/GB]; Flat 1, 18 Huskisson Street, Toxteth, Liverpool L8 7LR (GB).

(74) Agents: **THOMSON, Paul** et al.; Potts, Kerr & CO, 15 Hamilton Square, Birkenhead CH41 6BR (GB).

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

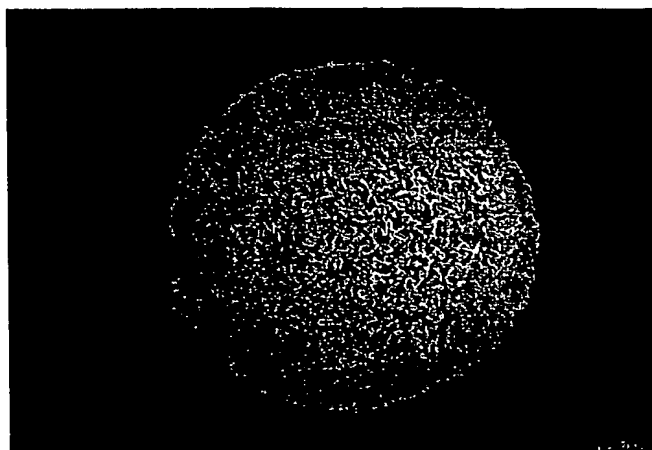
(84) Designated States (*regional*): ARIPO patent (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

**Published:**

- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

[Continued on next page]

(54) Title: DRUG DELIVERY PARTICLES AND METHODS OF TREATING PARTICLES TO IMPROVE THEIR DRUG DELIVERY CAPABILITIES



(57) Abstract: A first embodiment of the invention provides a method of engineering changes in the morphological, chemical or physical features of a particle, to promote, for example, the formation of hairs and pores on the surface of the particle. The presence of these engineered features facilitating the delivery of agents to a target region, such as beclomethasone to the alveoli of the lungs. Although the particle acts to deliver desired agents to a target region, the particle itself may also be an agent. The invention also provides particles specifically engineered by the above method so as to produce carrier particles suitable for particular tasks.

WO 2004/052334 A3



**(88) Date of publication of the international search report:**  
12 August 2004

*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

## INTERNATIONAL SEARCH REPORT

International Application No.

/GB 03/05353

A. CLASSIFICATION OF SUBJECT MATTER  
IPC 7 A61K9/00

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 A61K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the International search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ, CHEM ABS Data

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 508 969 A (AKTIEBOLAGET ASTRA) 14 October 1992 (1992-10-14) claims 1-10 page 3, line 6 - line 39 examples 1-3 -----	1-18, 21-33



Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

## \* Special categories of cited documents :

- \*A\* document defining the general state of the art which is not considered to be of particular relevance
- \*E\* earlier document but published on or after the International filing date
- \*L\* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- \*O\* document referring to an oral disclosure, use, exhibition or other means
- \*P\* document published prior to the international filing date but later than the priority date claimed

- \*T\* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- \*X\* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- \*Y\* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- \* & \* document member of the same patent family

Date of the actual completion of the international search

17 June 2004

Date of mailing of the international search report

01/07/2004

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
Fax: (+31-70) 340-3016

Authorized officer

Ventura Amat, A

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

/GB 03/05353

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0508969	A	14-10-1992	
		AT 137671 T	15-05-1996
		AT 208613 T	15-11-2001
		AU 662519 B2	07-09-1995
		AU 1534792 A	17-11-1992
		BG 61474 B1	30-09-1997
		BG 98147 A	15-11-1994
		CA 2106975 A1	12-10-1992
		CZ 9302116 A3	13-04-1994
		DE 69210601 D1	13-06-1996
		DE 69210601 T2	02-10-1996
		DE 69232207 D1	20-12-2001
		DE 69232207 T2	01-08-2002
		DK 580648 T3	16-09-1996
		DK 680752 T3	25-02-2002
		EE 2970 B1	15-04-1997
		EP 0508969 A1	14-10-1992
		EP 0580648 A1	02-02-1994
		EP 0680752 A2	08-11-1995
		ES 2086733 T3	01-07-1996
		ES 2168322 T3	16-06-2002
		FI 934429 A	08-10-1993
		GR 3020602 T3	31-10-1996
		HK 52497 A	02-05-1997
		HU 65095 A2	28-04-1994
		IE 921144 A1	21-10-1992
		JP 3400999 B2	28-04-2003
		JP 6506454 T	21-07-1994
		JP 2003155228 A	27-05-2003
		KR 216384 B1	16-08-1999
		NO 933575 A	06-10-1993
		PL 168232 B1	31-01-1996
		PT 680752 T	31-05-2002
		RO 115779 B1	30-06-2000
		RU 2112507 C1	10-06-1998
		WO 9218110 A1	29-10-1992
		SG 43180 A1	17-10-1997
		SK 108893 A3	09-03-1994
		US 5562923 A	08-10-1996
		US 5874063 A	23-02-1999